

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 August 2002 (08.08.2002)

PCT

(10) International Publication Number
WO 02/061090 A3

(51) International Patent Classification⁷: **C12N 15/13**,
15/70, 1/21, C07K 16/00, 19/00, A61K 47/48

(21) International Application Number: PCT/US01/48691

(22) International Filing Date:
13 December 2001 (13.12.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/256,164 14 December 2000 (14.12.2000) US

(71) Applicant (for all designated States except US): **GENENTECH, INC.** [US/US]; 1 DNA Way, SOUTH SAN FRANCISCO, CA 94080 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SIMMONS, Laura**

C. [US/US]; 1313 Grove Avenue, Burlingame, CA 94010 (US). **KLIMOWSKI, Laura** [CA/US]; 474 East 2nd Avenue, Salt Lake City, UT 84103 (US). **REILLY, Dorothea E.** [US/US]; 334 Mount Vernon, San Francisco, CA 94112-3634 (US). **YANSURA, Daniel G.** [US/US]; 330 Carmel Avenue, Pacifica, CA 94044 (US).

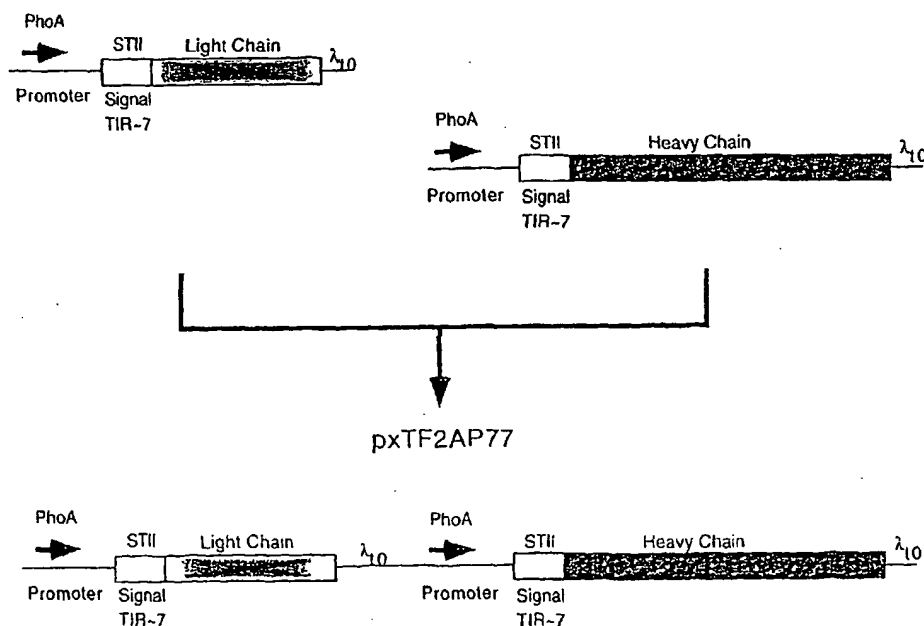
(74) Agent: **CUI, Steven X.**; c/o GENENTECH, INC., MS 49, 1 DNA Way, South San Francisco, CA 94080-4990 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: PROKARYOTICALLY PRODUCED ANTIBODIES AND USES THEREOF



(57) Abstract: The present invention provides methods and compositions for improved expression and production of recombinant antibodies in prokaryotic expression systems. Particularly contemplated are prokaryotic expression and production of full-length aglycosylated antibodies. The antibody products of the invention can be used in various aspects of biological research, diagnosis and medical treatment.

WO 02/061090 A3



European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:

21 August 2003

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C12N15/13 C12N15/70 C12N1/21 C07K16/00 C07K19/00 A61K47/48				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 C07K				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, BIOSIS, WPI Data, PAJ, MEDLINE, EMBASE, SEQUENCE SEARCH				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 93 19196 A (BOLT SARAH LOUISE ;CLARK MICHAEL RONALD (GB); GORMAN SCOTT DAVID () 30 September 1993 (1993-09-30) claim 1	28-41		
X	BOYD P N ET AL: "THE EFFECT OF THE REMOVAL OF SIALIC ACID, GALACTOSE AND TOTAL CARBOHYDRATE ON THE FUNCTIONAL ACTIVITY OF CAMPATH-1H" MOLECULAR IMMUNOLOGY, ELMSFORD, NY, US, vol. 32, no. 17/18, 1995, pages 1311-1318, XP000676340 ISSN: 0161-5890 the whole document	28-41		
--- -/---				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.				
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family			
Date of the actual completion of the international search <div style="text-align: center; font-weight: bold;">21 May 2003</div>	Date of mailing of the international search report <div style="text-align: center; font-weight: bold;">06/06/2003</div>			
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <div style="text-align: center; font-weight: bold;">Wagner, R</div>			

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ANDREAS SCHMIEDL AND STEFAN DÜBEL: "Antibody Engineering" 2001, SPRINGER, BERLIN HEIDELBERG XP002241889 page 257	1-41
A	WO 93 08300 A (UNIV CALGARY ;NG SHI CHUNG (CA); ANTHONY JAMES G (CA); WONG SUI LA) 29 April 1993 (1993-04-29) the whole document	1-27
A	US 5 747 662 A (SIMMONS LAURA C ET AL) 5 May 1998 (1998-05-05) the whole document	1-27
A	EP 0 731 167 A (XOMA CORP) 11 September 1996 (1996-09-11) example 7	1-27
T	SIMMONS LAURA C ET AL: "Expression of full-length immunoglobulins in Escherichia coli: Rapid and efficient production of aglycosylated antibodies." JOURNAL OF IMMUNOLOGICAL METHODS, vol. 263, no. 1-2, 2002, pages 133-147, XP002241888 1 May, 2002 ISSN: 0022-1759 the whole document	1-41

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9319196	A	30-09-1993	AT 155818 T	15-08-1997
			AU 671085 B2	15-08-1996
			AU 2766892 A	21-10-1993
			DE 69221147 D1	04-09-1997
			DE 69221147 T2	15-01-1998
			EP 0586617 A1	16-03-1994
			ES 2106195 T3	01-11-1997
			WO 9319196 A1	30-09-1993
			GR 3024489 T3	28-11-1997
			JP 7500017 T	05-01-1995
			KR 238497 B1	15-01-2000
			US 5585097 A	17-12-1996
WO 9308300	A	29-04-1993	WO 9308300 A1	29-04-1993
US 5747662	A	05-05-1998	NONE	
EP 0731167	A	11-09-1996	EP 0731167 A1	11-09-1996
			AT 102249 T	15-03-1994
			EP 0550400 A2	07-07-1993
			AT 140266 T	15-07-1996
			AT 197315 T	15-11-2000
			AU 632462 B2	07-01-1993
			AU 2324488 A	01-03-1989
			CA 1341235 C	22-05-2001
			DE 3855421 D1	14-08-1996
			DE 3855421 T2	06-03-1997
			DE 3856440 D1	07-12-2000
			DE 3856440 T2	13-06-2001
			DE 3888186 D1	07-04-1994
			DE 3888186 T2	22-09-1994
			DK 19290 A	23-03-1990
			EP 0371998 A1	13-06-1990
			JP 2991720 B2	20-12-1999
			JP 3501321 T	28-03-1991
			WO 8900999 A1	09-02-1989
			US 5618920 A	08-04-1997
			US 5595898 A	21-01-1997
			US 5576195 A	19-11-1996
			US 5693493 A	02-12-1997
			US 5698417 A	16-12-1997
			US 5698435 A	16-12-1997
			US 6204023 B1	20-03-2001
			US 5846818 A	08-12-1998

THIS PAGE BLANK (USPTO)